

A NEW SPECIES OF SMALL-EARED SHREW, GENUS  
*CRYPTOTIS* (INSECTIVORA: SORICIDAE),  
FROM HONDURAS

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*Abstract.*—We describe a new species of small-eared shrew, *Cryptotis hondurensis*, from high elevation pine forest on the western slope of Cerro Uyuca, Francisco Morazán Province, southcentral Honduras. The new shrew is most similar in outward appearance to *C. gracilis*, from which it can be distinguished by cranial and dental features, particularly a shorter, broader mandible with a coronoid process that meets the ramus at nearly a right angle and an m3 with a simple talonid. Cranially, the new species is most similar to *C. nigrescens merriami*, but differs from this species in its longer tail and several cranial and dental features, including a more complex M3. The holotype of the new species had been identified as *C. gracilis* and represented the only specimen of that species north of Costa Rica. Its recognition as a distinct species removes *C. gracilis* from the known fauna of Honduras. The other species of *Cryptotis* presently known from Honduras are *C. nigrescens merriami* and *C. parva orophila*.

*Resumen.*—Se describe una nueva especie de musaraña, *Cryptotis hondurensis* (Insectivora: Soricidae), del bosque montanoso de la ladera occidental del Cerro Uyuca, Francisco Morazán, Honduras. Externamente, la nueva especie es similar a *C. gracilis* pero se diferencia de *C. gracilis* en características craneales y dentales; en particular, en la presencia de una mandíbula mas corta y mas ancha y con un proceso coronoides que se junta con la rama mandibular en un ángulo de casi 90 grados. Además, m3 presenta una talonida simple. El cráneo de la nueva musaraña se semejante al de *C. nigrescens merriami* pero la nueva especie difiere de *C. nigrescens merriami* por su cola mas larga y en varias características craneales y dentales incluyendo M3 con una corona mas compleja. El holotipo de la nueva especie había sido identificado como *C. gracilis* y este espécimen era el único representante de esta especie al norte de Costa Rica. El reconocimiento de este espécimen como una especie distinta, limita la distribución de *C. gracilis* a Costa Rica y Panamá y la remueve de la fauna de Honduras. Las otras especies de *Cryptotis* que habitan en Honduras son *C. nigrescens merriami* y *C. parva orophila*.

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Small-eared or least shrews of the genus *Cryptotis* (Insectivora: Soricidae) are widely distributed in North America, Central America, and northern South America. They are found in extreme southern Ontario, across much of the eastern and midwestern United States, through eastern, central, and southern Mexico, at high elevations in Cen-

tral America, and in the northern Andean highlands. The systematics of the Neotropical species are problematic, in part because few specimens have been available, and individual and geographic variation has been difficult to evaluate. Choate (1970) recognized eight species of *Cryptotis* from Mexico and Central America. His monograph was

the first comprehensive revision of any group in the genus, providing an important framework for study of these shrews.

One of the most poorly known species of Neotropical *Cryptotis*, *C. gracilis*, was reported by Choate (1970) as ranging from southern Honduras to western Panama. Among the specimens he referred to *C. gracilis* were one specimen from southern Honduras, 38 from Costa Rica, and three from western Panama. The acquisition of additional specimens of *C. gracilis* from Costa Rica and Panama prompted us to re-examine this species throughout its range. Detailed comparison of the single specimen from Honduras with Costa Rican and Panamanian *C. gracilis* reveals that it represents a previously unrecognized species. Acquisition of two additional specimens of the new species during the course of our study confirms its distinctiveness. The purposes of this paper are to describe and illustrate this new small-eared shrew and to briefly document its relationship to other members of the genus *Cryptotis*.

### Methods

All external and craniodental measurements reported herein are in millimeters (mm). External measurements of the holotype were taken by us on the fluid preserved specimen with the skull removed. External measurements of the two paratypes were taken by us on the fluid preserved specimens with the skulls in place; subsequently, we removed the skulls and all craniodental measurements were taken from cleaned skulls. Sixteen cranial measurements were taken to the nearest 0.1 mm using either a hand-held dial caliper or an ocular micrometer in a Wilde M50 binocular microscope (Table 1). Cranial measurements follow Choate (1970), in part, and mandibular measurements follow Jammot (1972), in part. All craniodental measurements are further diagrammed in a forthcoming manuscript by us on geographical variation in *C. gracilis*. Dental terminology follows

Choate (1970). Capitalized color names are from Ridgeway (1912).

Multivariate analyses were carried out using the University of Kansas Academic Computing Services' IBM VM/CMS operating system. Discriminant function analysis (BMDP7M) was performed on 8 cranial and 7 mandibular measurements (Table 1; condylobasal length was not used because it was not measurable on all specimens) to discriminate among *C. gracilis* ( $n = 20$ ), *C. nigrescens merriami* ( $n = 13$ ), and *C. parva orophila* ( $n = 16$ ). The holotype and one paratype of the new species were inserted into the discriminant function model as unknowns to evaluate their similarities to other species from the region. Because of their morphometrical similarity to *C. nigrescens merriami* based on the discriminant function analysis, principal components analysis (BMDP4M) was run using the same 15 variables. The holotype and one paratype of the new species and all specimens of *C. gracilis*, *C. nigrescens merriami*, and *C. parva orophila* were included in this analysis as a single population.

Specimens from the following institutions (followed by their acronyms) were examined in this study: American Museum of Natural History, New York (AMNH); Field Museum of Natural History, Chicago (FMNH); University of Kansas Museum of Natural History, Lawrence (KU); Louisiana State University, Baton Rouge (LSU); Museum of Vertebrate Zoology, University of California, Berkeley (MVZ); University of Michigan Museum of Zoology, Ann Arbor (UMMZ); Universidad Nacional Autónoma de Honduras, Tegucigalpa (UNAH); National Museum of Natural History, Washington, D.C. (USNM).

### *Cryptotis hondurensis*, new species

Figs. 1, 4B, 5B

*Cryptotis gracilis*.—Choate, 1970:282–285 [part].—Hall, 1981, 1:63–64 [part].

*Holotype*.—Skull of adult female with body preserved whole in alcohol, KU

106941; collected 5 Jul 1966 by William E. Duellman (collector number M-1405). Skull complete and unbroken; body intact, but with a patch of hair missing from venter.

The collection date is given in the original field catalog as 6 July 1966. However, the collector pointed out to us that this is probably the date he entered the specimen into his catalog. His original field notes indicate that the specimen was collected 5 July.

*Paratypes.*—(2): Skull of adult female with body preserved whole in alcohol, FMNH 86886; collected in the 1950s by Luis and Terua Williams. Skull lacking braincase; body intact.

Skull of juvenile male with body preserved whole in alcohol, UNAH (no number); collected 7 Feb 1988 by E. Frainvilledo (lot number 977). Skull lacking braincase and portions of palate and rostrum; body intact, but with a patch of hair missing from venter.

*Type locality.*—Honduras: Francisco Morazán Department; 12 km WNW of El Zamorano, W slope of Cerro Uyuca [=Cerro Oyuca; ca. 14°05'N, 87°06'W], 1680 m. The holotype was collected in pine forest (*Pinus pseudostrobus*) heavily laden with bromeliads; this region lies within the Lower Montane Moist Forest Life Zone of Holdridge (Organization of American States 1962).

*Distribution.*—Known only from pine and mixed pine and oak forests in highlands immediately east of Tegucigalpa; perhaps occurs throughout the Lower Montane Moist Forest Life Zone community or in high elevation pine forests in Honduras and possibly in neighboring areas of Guatemala, El Salvador, and Nicaragua.

*Measurements of holotype.*—Total length, ca. 84; tail, 29; hind foot, 12; ear, 6; condylobasal length, 19.2; palatal length, 8.4; maxillary breadth, 6.0; interorbital breadth, 4.3; maxillary tooththrow, 7.1; cranial breadth, 9.2; mandibular tooththrow, 5.5 (see Table 1).

*Diagnosis.*—A smaller species of the genus *Cryptotis* characterized by its similar dorsal and ventral coloration, a long and

tapered tail, a long and narrow snout, a wide zygomatic plate, a complex M3, nearly perpendicular conformation of the junction of the coronoid process with the horizontal ramus, a short and broad articular process, and talonid of m3 with only a single cusp.

*Description.*—Size small for the genus (Table 1); tail long (ca. 42–53% of head and body length), tapering to a point; front feet and claws normal for genus, not enlarged; viewed ventrally, the snout is long and narrow; when air-dried the pelage of the fluid-preserved holotype is dense and soft, the dorsal guard hairs about 4 to 5 mm long; dorsal fur shows distinct banding, the proximal 75% of the guard hairs is pale gray in color, whereas the distal 25% is close to Prout's Brown; venter appears somewhat paler than dorsum. The overall brownish coloration of the specimen may be due to fading or bleaching. This color resembles some older, fluid-preserved specimens of *C. gracilis*, yet *C. gracilis* preserved as dried study skins are Fuscous to Chaetura Black.

Rostrum long, of medium breadth relative to other *Cryptotis* (Fig. 1); interorbital constriction of medium breadth; braincase low, flat; zygomatic plate long, anterior border aligned with mesostyle-metastyle valley of M1, posterior border aligned with posterior base of maxillary process and middle of M3; upper tooththrow may be uncrowded, U4 aligned with tooththrow and clearly visible in labial view (holotype—Fig. 4B) or crowded, U4 displaced medially and not clearly visible in labial view (both paratypes); P4, M1, M2 slightly recessed on posterior border; M3 with paracrista, precentrocrista, and short postcentrocrista, as well as well developed protocone, paracone, and metacone; dentition not particularly bulbous.

Mandible short, moderately broad for the genus (Fig. 1); coronoid process joins horizontal ramus at nearly a right angle; distance between coronoid process and posterior border of m3 is short; viewed posteriorly, articular process is short and narrow, with a broad ventral articular facet

Table 1.—Means ( $\pm SD$ ) and observed ranges for skin, cranial, and mandibular measurements of Central American *Cryptotis* used in this study. Sample sizes (in parentheses) may be different for head and body length, tail length, and condylobasal length. The order of measurements of *C. hondurensis* is the holotype followed by the two paratypes. Missing measurements from the paratypes are represented by x.

<i>C. hondurensis</i> (holotype and 2 paratypes)	<i>C. gracilis</i> ( <i>n</i> = 20)	<i>C. nigrescens merriami</i> ( <i>n</i> = 13)	<i>C. parva orophila</i> ( <i>n</i> = 16)
Head and body length			
55, 63, 64	73 $\pm$ 5 60–79 ( <i>n</i> = 18)	69 $\pm$ 4 65–76	65 $\pm$ 7 58–77 ( <i>n</i> = 11)
Tail length			
29, 27, 27	34 $\pm$ 3 30–41 ( <i>n</i> = 18)	29 $\pm$ 3 24–33	21 $\pm$ 2 17–24 ( <i>n</i> = 11)
Tail length (as % of head and body length)			
53, 43, 42	48 $\pm$ 5 38–58 ( <i>n</i> = 18)	42 $\pm$ 5 32–50	33 $\pm$ 4 29–38 ( <i>n</i> = 11)
Condylobasal length			
19.2, x, x	19.6 $\pm$ 0.5 18.7–20.4	19.4 $\pm$ 0.3 18.9–20.0 ( <i>n</i> = 11)	17.1 $\pm$ 0.3 16.7–17.7 ( <i>n</i> = 10)
Zygomatic plate length			
2.2, 2.0, 2.1	1.8 $\pm$ 0.1 1.5–2.0	2.3 $\pm$ 0.2 2.0–2.6	1.5 $\pm$ 0.1 1.4–1.8
Interorbital breadth			
4.3, 4.5, x	4.7 $\pm$ 0.2 4.1–5.2	4.8 $\pm$ 0.1 4.5–4.9	4.0 $\pm$ 0.1 3.8–4.4
U1–U1 breadth			
2.4, 2.4, x	2.4 $\pm$ 0.2 2.0–2.6	2.7 $\pm$ 0.1 2.4–2.8	2.4 $\pm$ 0.1 2.0–2.5
M2–M2 breadth			
5.4, 5.4, x	5.4 $\pm$ 0.3 5.0–5.8	5.9 $\pm$ 0.1 5.6–6.2	5.1 $\pm$ 0.2 4.9–5.5
Palatal length			
8.4, 7.8, x	8.8 $\pm$ 0.3 8.3–9.3	8.4 $\pm$ 0.2 8.1–8.8	7.2 $\pm$ 0.4 6.0–7.8
Maxillary toothrow length (U1–M3)			
7.1, 7.1, 7.1	7.6 $\pm$ 0.3 7.1–8.0	7.4 $\pm$ 0.1 7.1–7.5	6.2 $\pm$ 0.2 5.9–6.7
Unicuspid toothrow length			
2.6, 2.4, 2.4	2.6 $\pm$ 0.1 2.4–2.9	2.5 $\pm$ 0.1 2.3–2.6	2.0 $\pm$ 0.1 1.8–2.2
Posterior width of M1			
1.7, 1.7, 1.9	1.7 $\pm$ 0.1 1.6–1.8	1.9 $\pm$ 0.1 1.8–2.0	1.6 $\pm$ 0.1 1.6–1.8
Mandibular length (inferior sigmoid notch to mental foramen)			
6.1, 5.8, 6.3	6.4 $\pm$ 0.2 6.1–6.7	6.6 $\pm$ 0.2 6.3–6.8	5.4 $\pm$ 0.2 4.8–5.8

Table 1.—Continued.

<i>C. hondurensis</i> (holotype and 2 paratypes)	<i>C. gracilis</i> ( <i>n</i> = 20)	<i>C. nigrescens merriami</i> ( <i>n</i> = 13)	<i>C. parva orophila</i> ( <i>n</i> = 16)
Coronoid process height			
4.8, 4.4, 4.6	4.1 ± 0.2 3.7–4.4	5.1 ± 0.2 4.8–5.3	4.1 ± 0.2 3.7–4.3
Articular condyle height			
3.6, 3.6, 3.8	3.7 ± 0.2 3.3–4.0	3.8–0.2 3.6–4.3	3.4 ± 0.1 3.2–3.7
Distance from articular condyle to m3			
4.3, 4.3, 4.4	5.1 ± 0.2 4.8–5.3	4.7 ± 0.1 4.5–4.9	4.1 ± 0.1 4.0–4.3
Articular condyle breadth			
3.0, 2.8, 2.8	3.0 ± 0.1 2.7–3.1	3.1 ± 0.1 3.0–3.2	2.6 ± 0.1 2.4–2.7
Mandibular toothrow (p3–m3) length			
5.5, 5.3, 5.7	6.0 ± 0.2 5.6–6.3	5.7 ± 0.1 5.4–5.9	4.9 ± 0.2 4.7–5.3
m1 length			
1.7, 1.7, 1.7	1.7 ± 0.1 1.5–1.8	1.8 ± 0.2 1.7–1.9	1.5 ± 0.1 1.3–1.6

(Fig. 5B); lower sigmoid notch shallow; upper sigmoid notch rounded; posterior border of lower incisor extends posterior to the cusps of p4; talonid of m3 consists of hypoconid only.

*Comparisons.*—*Cryptotis hondurensis* resembles *C. gracilis* in its long tail, the complexity of the cusps of M3, and in some general external and cranial features, which account for its previous allocation to the latter species. However, it is much closer in many other features to *C. nigrescens merriami*, to which it may be most closely related phylogenetically. It differs from *C. gracilis*, *C. nigrescens merriami*, and *C. parva orophila* in the following:

*Cryptotis gracilis* (Figs. 2, 4A, 5A): *Cryptotis hondurensis* has shorter (4–5 mm vs. 6–7 mm), less woolly dorsal pelage; a shorter, broader rostrum that is not as highly arched; narrower braincase; narrower interorbital constriction; longer zygomatic plate; relatively shorter maxillary toothrow; P4 almost quadrate; M1 shorter and broader; paracone and metacone of M3 closer to-

gether; coronoid process absolutely higher, joining horizontal ramus at nearly a right angle; shorter distance between coronoid process and m3; shorter mandibular toothrow; shorter, broader articular process, with much broader ventral articulating surface; shallower lower sigmoid notch; posterior margin of lower incisor extends posterior to cusps of p4; broader and more massive m1 and m2; talonid of m3 consists of only hypoconid.

*Cryptotis parva orophila*: *Cryptotis hondurensis* is larger and has a longer tail relative to body; longer (4–5 mm vs. 3–4 mm), silkier dorsal pelage; longer, narrower rostrum; lower, flatter braincase; P4, M1, M2 not as deeply recessed posteriorly; M3 with paracrista, precentrocrista, postcentrocrista, and well developed paracone and metacone; narrower articular process of mandible, with much broader ventral articulating surface.

*Cryptotis nigrescens merriami* (Figs. 3, 4C, 5C): *Cryptotis hondurensis* has a longer, narrower tail, tapering to a point at its tip rather

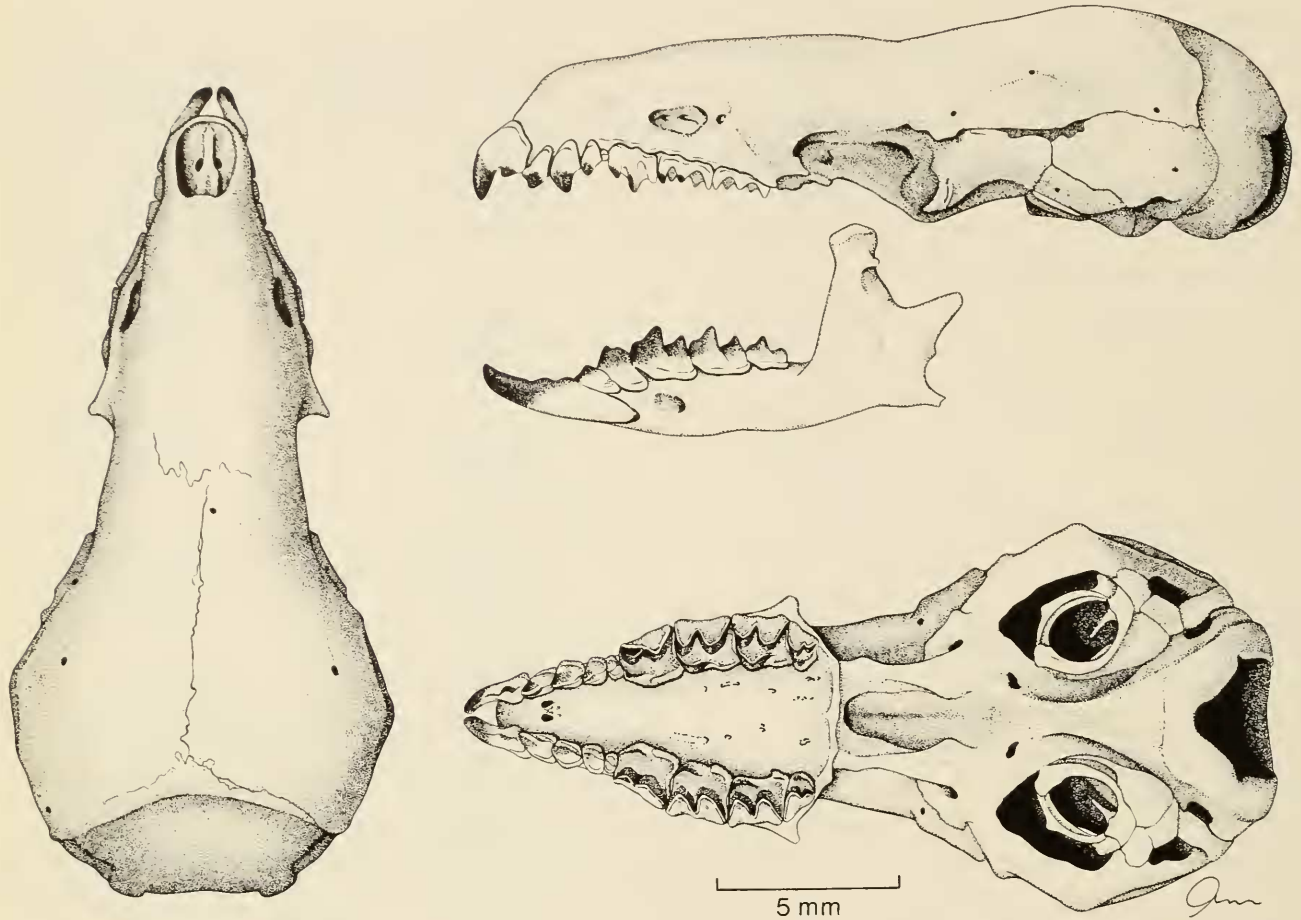


Fig. 1. Dorsal and ventral view of the skull and lateral views of the skull and mandible of the holotype of *C. hondurensis* (KU 106941).

than being thick and rounded as in *C. nigrescens merriami*; relatively longer, narrower rostrum; much narrower palate; lower, flatter braincase; less massive upper and lower molars and upper unicuspid; M3 with paracrista, precentrocrista, postcentrocrista, and well developed paracone and metacone; teeth not bulbous; smaller and narrower articular process of mandible.

*Etymology.*—The specific epithet *hondurensis* is derived from Honduras, the country of origin of the holotype and both paratypes.

#### Multivariate Analyses

Discriminant function analysis yielded a numerical model that required four measurements to discriminate among the three species: palatal length, coronoid process height, distance from articular condyle to posterior of m3, and zygomatic plate breadth. All specimens of *C. gracilis*, *C. ni-*

*grescens*, and *C. parva* were correctly classified into their predetermined groups. The holotype and paratype of *C. hondurensis* are clearly distinct from *C. gracilis* and are closest to *C. nigrescens merriami* in general cranial shape and size, as can be seen in a plot of specimens on canonical axes 1 and 2 (Fig. 6).

Principal components analysis revealed clear distinctions among the four taxa, separating without overlap all specimens of *C. gracilis*, *C. nigrescens*, and *C. parva*, and showing *C. hondurensis* intermediate amongst them on factor axes 1 and 2 (Fig. 7). In this model, Factor 1 is clearly a size axis and Factor 2 is a shape axis contrasting a group of variables representing mandibular height and palatal width (coronoid process height, posterior width of M1, U1–U1 breadth, zygomatic plate breadth, and M2–M2 breadth) with a second group of variables representing mandibular and palatal lengths (articular condyle to m3 distance,

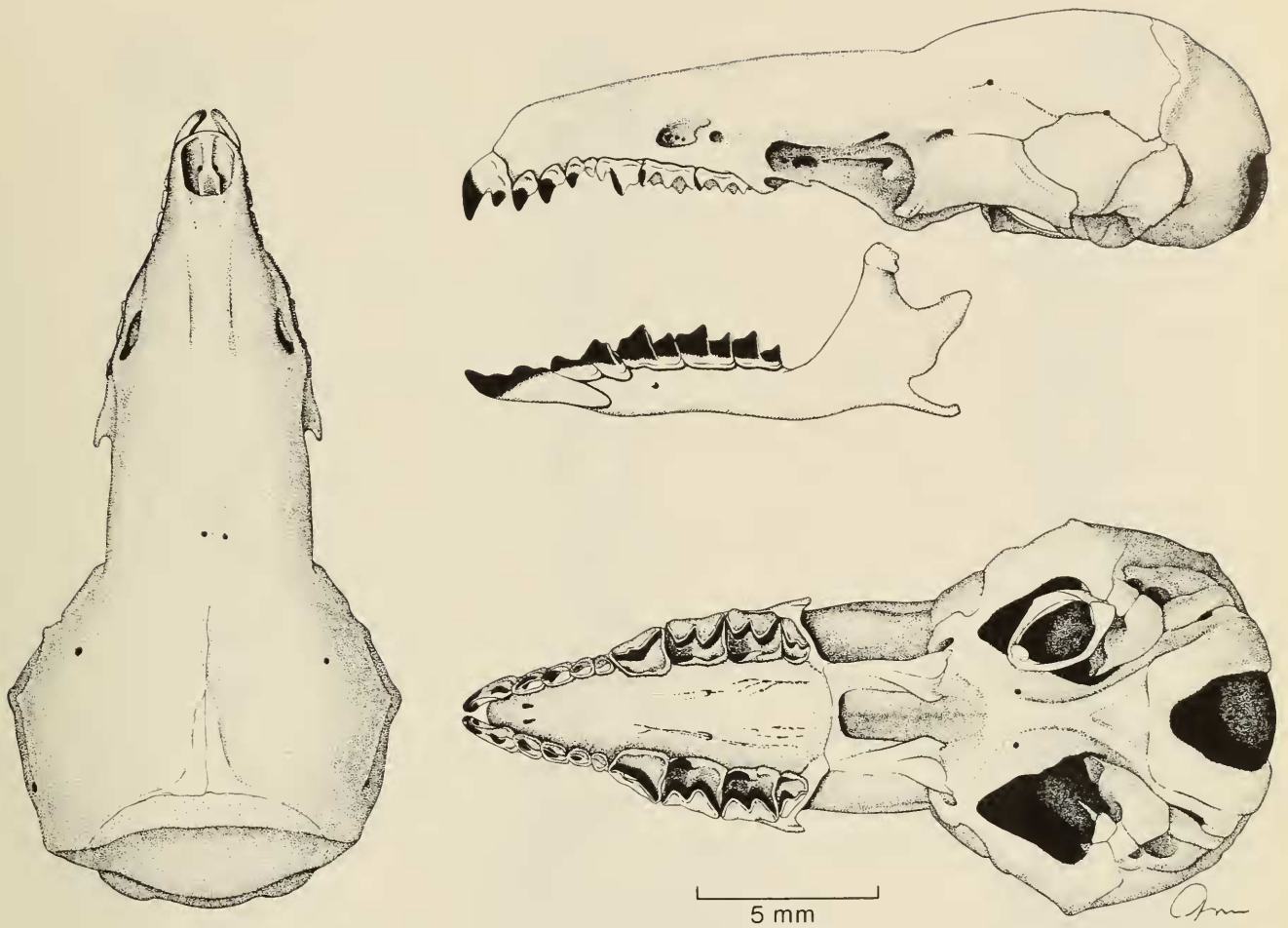


Fig. 2. Dorsal and ventral view of the skull and lateral views of the skull and mandible of *C. gracilis* (LSU 12659).

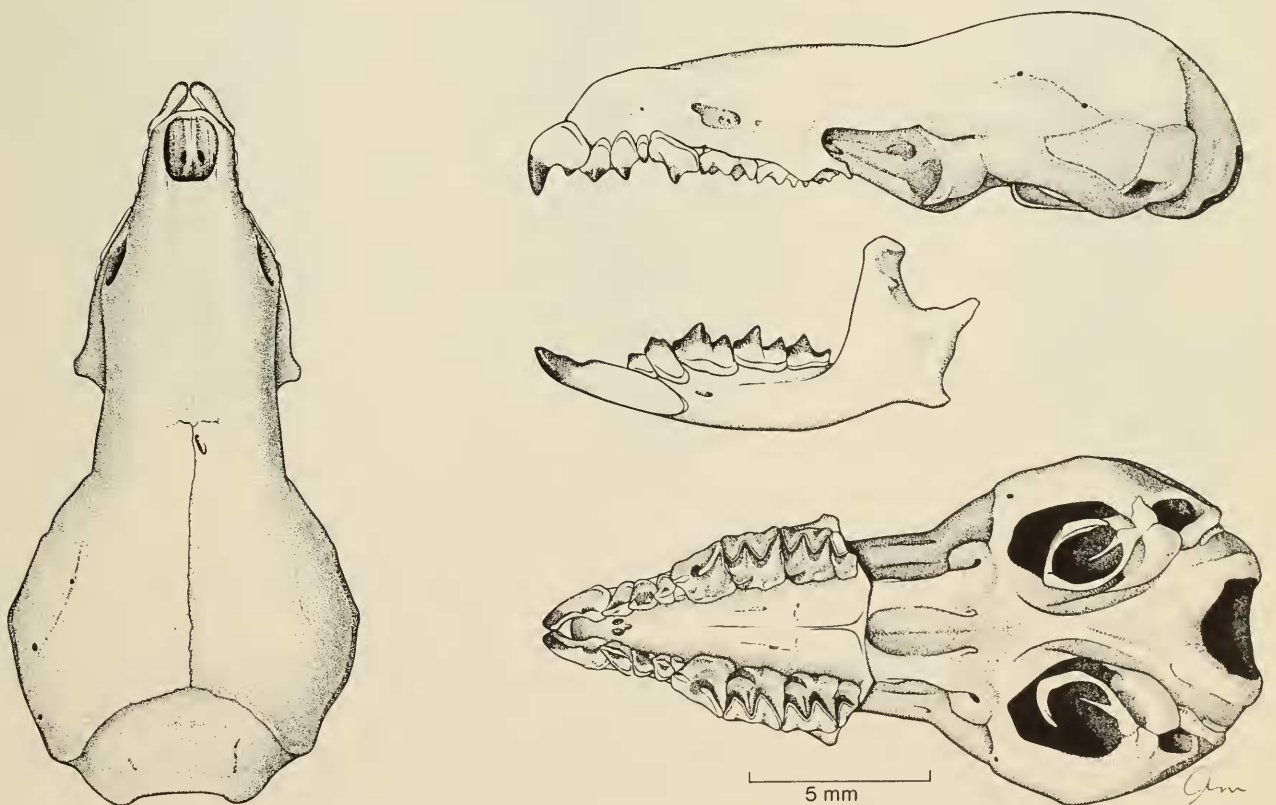


Fig. 3. Dorsal and ventral views of the skull and lateral views of the skull and mandible of *C. nigrescens merriami* (MVZ 130335).

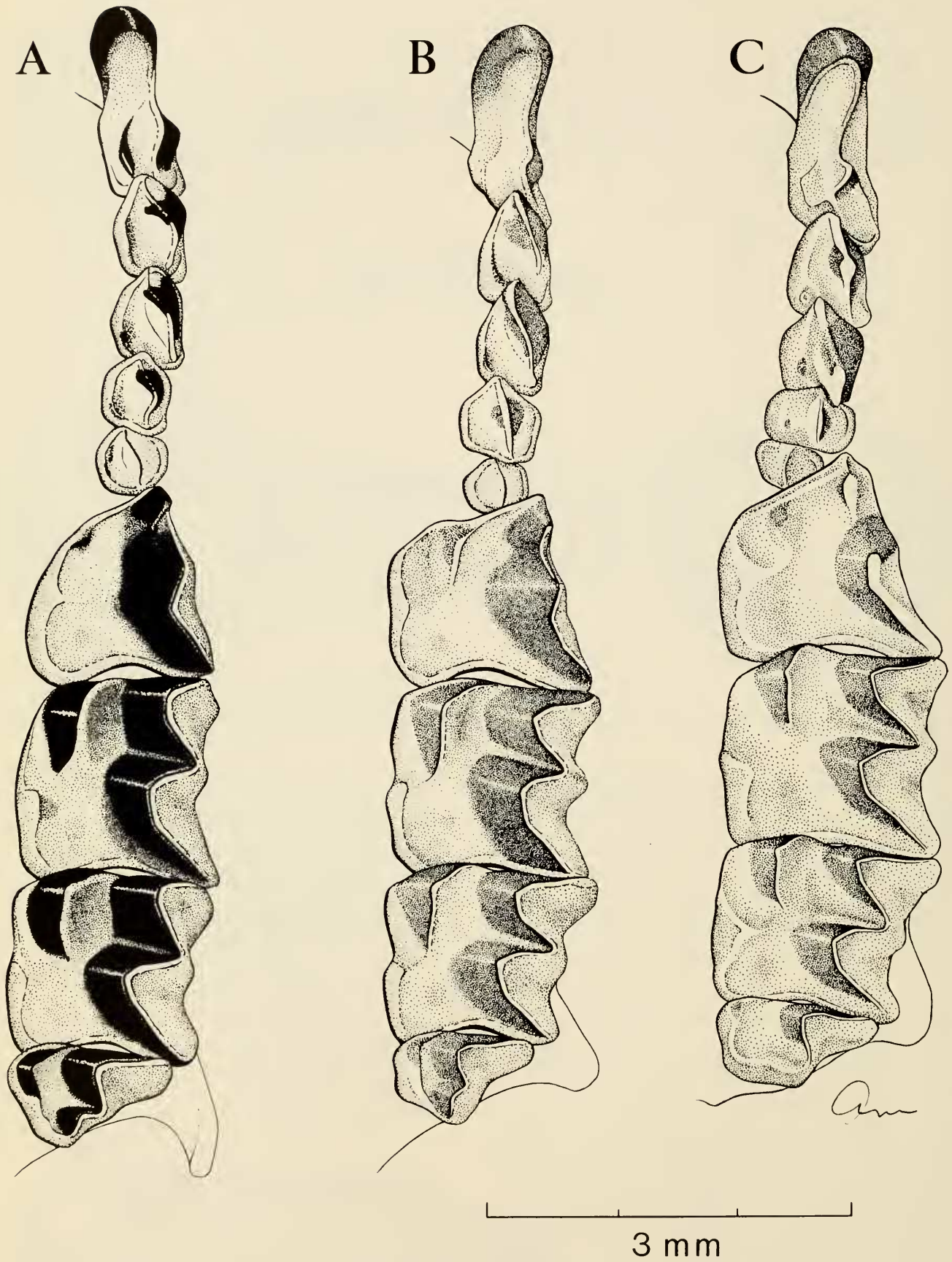


Fig. 4. Left maxillary tooththrows of *C. gracilis* (A), *C. hondurensis* (B), and *C. nigrescens merriami* (C).



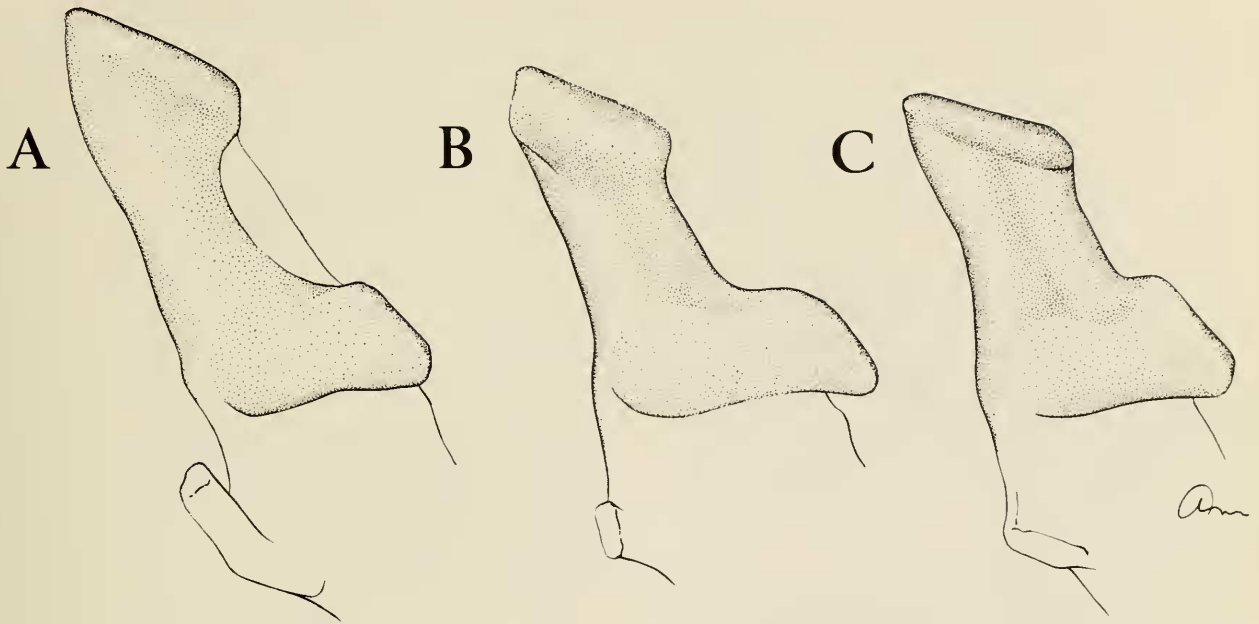


Fig. 5. Left mandibular articular condyles of *C. gracilis* (A), *C. hondurensis* (B), and *C. nigrescens merriami* (C).

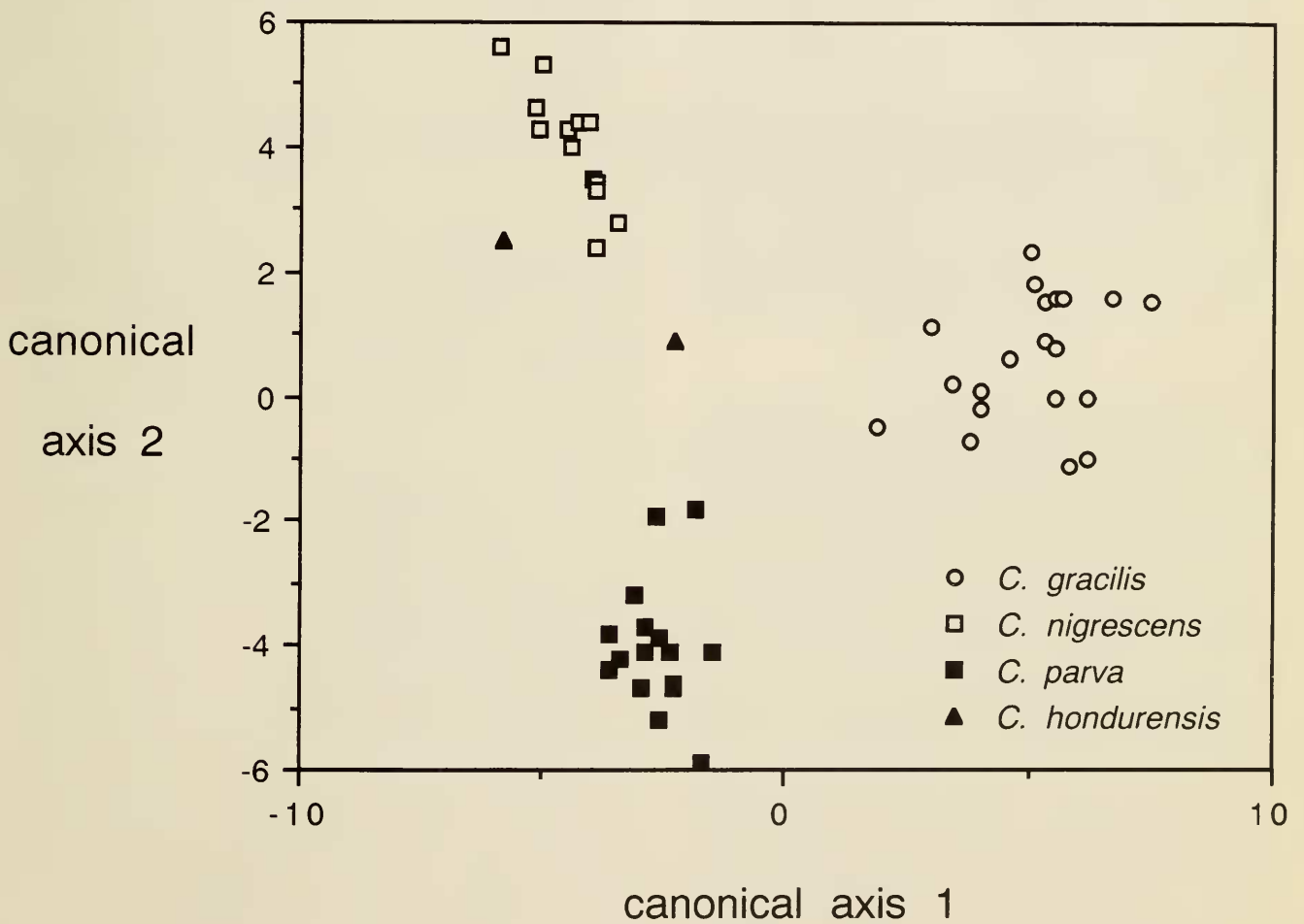


Fig. 6. Plot of specimens of *C. gracilis*, *C. nigrescens merriami*, and *C. parva orophila* and the holotype and one paratype of *C. hondurensis* on canonical axes 1 and 2.

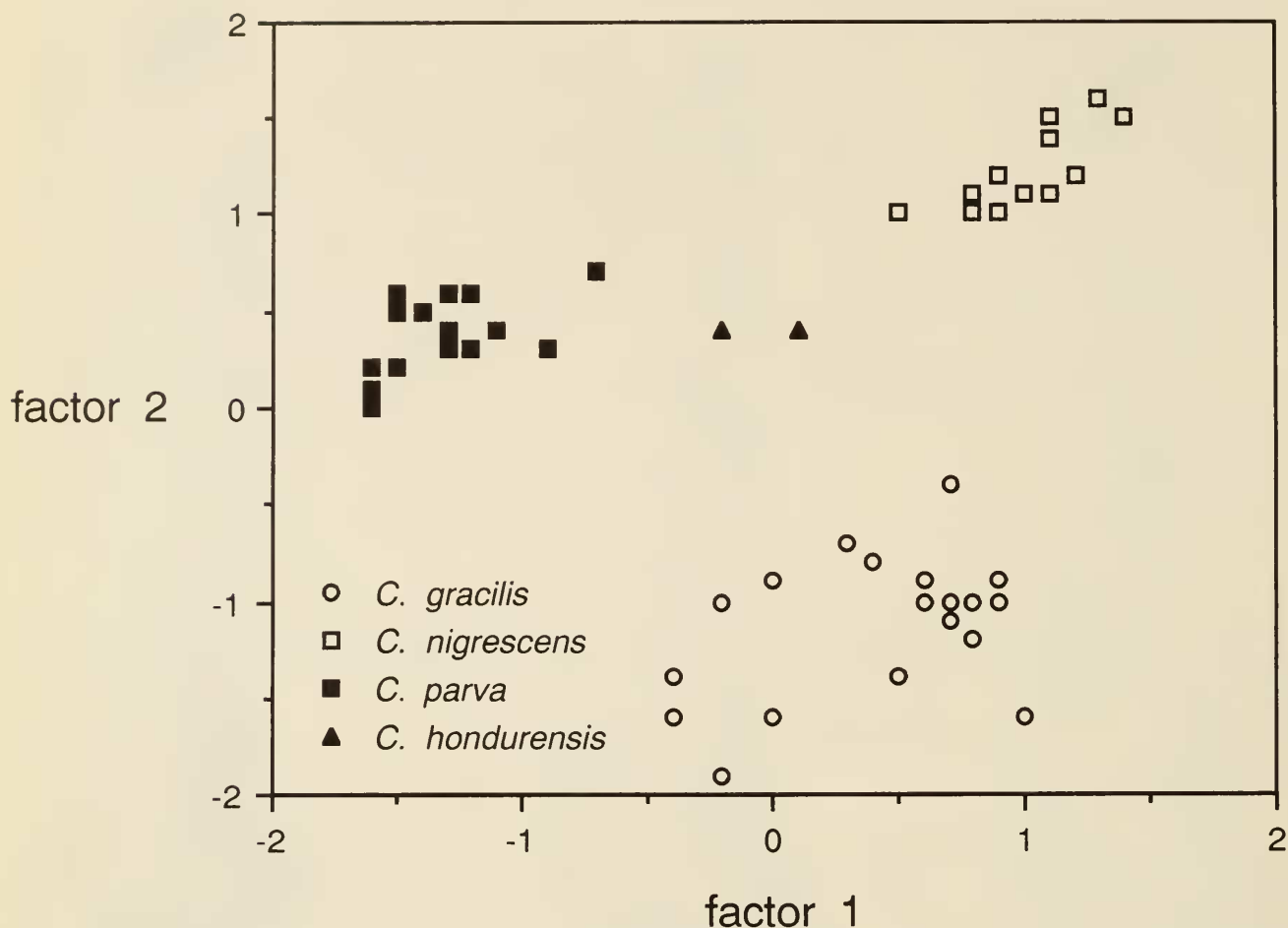


Fig. 7. Plot of specimens of *C. gracilis*, *C. nigrescens merriami*, and *C. parva orophila* and the holotype and one paratype of *C. hondurensis* on principal components factor axes 1 and 2.

palatal length, unicuspid toothrow, mandibular toothrow, and maxillary toothrow).

#### Discussion

Choate (1970:284) first noted some of the differences between the Honduran specimen and Costa Rican *C. gracilis*: "the specimen from Honduras differs from typical Costa Rican individuals in being slightly smaller, both externally and cranially, and in having only one cusp (the hypoconid) as opposed to both hypoconid and entoconid on the talonid of m3." Although the crania of *C. hondurensis* and *C. gracilis* appear similar in general aspect, important differences exist, particularly in the shape of the rostrum and the breadth of the zygomatic plate. In addition, the mandibles of the two species are quite distinct (Figs. 1, 2). *Cryp-*

*totis gracilis* has a long, narrow, mandibular ramus with small teeth and an uncrowded toothrow. The coronoid process has a wide base that attaches to the ramus at a low angle. The shape and angle of the coronoid process in *C. gracilis* is unlike any Recent or fossil Holarctic soricid we have studied and instead allies *C. gracilis* with certain Central American and South American species. In contrast, *C. hondurensis* has a mandible more typical of the family: short and broad, with the coronoid process joined to the horizontal ramus at a nearly right angle. The mandibular articular process of *C. hondurensis* is similar to that of *C. nigrescens*, but the lower articulation is relatively much broader in *C. hondurensis* than in other species of *Cryptotis* we have studied.

Among species of *Cryptotis* the M3 is highly variable in size and coronal com-

plexity. Choate (1970) indicated that, in the primitive condition, the tooth is relatively large with paracrista, paracone, precentrocrista, postcentrocrista, metacone, and metacrista. In more specialized grades, M3 becomes successively shortened posteriorly, with resulting diminution and loss of the more posterior and lingual structures (Choate 1970). If this character polarity is true, then the M3 of *C. hondurensis*, like that of *C. gracilis*, is rather primitive for the genus. *Cryptotis hondurensis* possesses both paracone and metacone on M3 but, unlike *C. gracilis*, these structures are close together and the mesostyle does not extend very far labially (Fig. 4A, B).

Using keys to North and Middle American *Cryptotis* provided by Choate (1970) and Hall (1981), *C. hondurensis* would be identified as *C. gracilis* in couplet 2'. However, the two species can be separated readily on the basis of the contrasting characters described above.

The Honduran specimen referred to *C. gracilis* by Choate (1970) represented the only known example of *C. gracilis* from north of Costa Rica. Our recognition of this animal as a distinct species restricts the known range of *C. gracilis* to the Talamanca and Tilarán highlands of Costa Rica and the adjacent Chiriquí highlands of extreme western Panama.

#### Acknowledgments

We thank William E. Duellman, whose field efforts provided the specimen described herein as the holotype of *C. hondurensis* and who generously provided additional information regarding the collection of this specimen. Anne M. Musser skillfully executed the illustrations. We are grateful to Thor Holmes for his expertise in specimen preparation, Cara Burres for help with computer graphics, and Norman A. Slade and Marianna D. Wood for advice in using multivariate statistics. Michael D. Carleton,

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Appendix  
Specimens Examined

*Cryptotis gracilis* (20). Costa Rica: Cartago: Volcán Irazú, Finca Coliblanco, 2350 m (2 UMMZ); Volcán Irazú, 0.25 mi N of San Juan Chicao, 2860 m (1 UMMZ); Volcán Irazú, 2500 m (1 KU); Volcán Turrialba, Hacienda El Retiro, 2590 m (4 UMMZ). San José: Cerro Chirripó, Headwaters of Río Talari, 11,600 ft (4 LSU); Cerro de la Muerte, Hotel Georgina, 3100 m (1 USNM); La Piedra, ca. 4 mi SW Cerro Chirripó, 10,500 ft (4 LSU); Las Vueltas, 8000 ft (1 UMMZ). Panama: Bocas del Toro: Cerro Fabrega, 8400 ft (1 USNM). Chiriquí: Cerro Punta, Boquete Trail, 7600 ft (1 USNM).

*C. hondurensis* (3). Honduras: Francisco Morazán: Cerro Uyuca (1 KU—holotype); near San Juancito

mines, 1700 m (1 FMNH); La Rosario, San Juancito, La Tigra National Park (1 UNAH).

*C. nigrescens merriami* (13). El Salvador: Morazán: Mount Cacaguatique, 3800–4700 ft (2 MVZ). San Miguel: Mount Cacaguatique, 3500–4000 ft (7 MVZ, 2 UMMZ). Guatemala: Alta Verapaz: Tucuru, Hacienda Concepción, 1100 m (1 UMMZ). Huehuetenango: Barrillas, Hacienda Santa Gregoria (1 UMMZ).

*C. parva orophila* (16). Costa Rica: Alajuela: Zarcero, 6000 ft (1 FMNH); Cartago: Cartago (2 UMMZ); Cerro Tablazo, 1983 m (1 USNM); La Estrella (1 AMNH). Heredia: Barva, San José de la Montaña, Paso Llano, 1800 m (3 KU); Barva, San Miguel de la Montaña, 1690–1700 m (3 KU). San José: 10 mi S. of Cartago, El Muñeco, 3800 ft (1 UMMZ); San Rafael de Montes de Oca, 4300 ft (1 KU); Santa Ana (1 LSU). Nicaragua: Jinotega: 12 km S. of Jinotega, 1400 m (1 KU). Matagalpa: 9 mi N. of Matagalpa, Santa María de Ostuma, 1300 m (1 UMMZ).